RamSoft Hosted Customer Platform Specifications

Version 6.7

MANUFACTURER
RamSoft Incorporated
20 Adelaide St. East, Suite 1105
Toronto, ON M5C 2T6,
CANADA

Toll Free: (888) 343-9146
Fax : (416) 674-7147
Web Site: http://www.ramsoft.com

Table of Contents

RamSoft Platform Specifications Version 6.7

1. EXECUTIVE SUMMARY

The purpose of this document is to provide optimal hardware and software specifications for various RamSoft products when deploying on customer premise.

All the stated requirements in the following document are based on typical workloads RamSoft has seen in its customer base. Resource requirements may vary dependent on items such as; Modality, retention, Concurrent users, etc.

Please be aware that requirements are subject to change without notice.

Customer Responsibility:

- **Dedicated Resources**
  Any resource outlined below, whether server or workstation, must be reserved for the sole purpose of running a RamSoft product as well as its required components. Utilizing such resources for any other purpose can have unforeseen impacts, and RamSoft cannot guarantee functionality in such situations.
- **Anti-Malware**
  Customer is strongly advised to deploy and maintain an enterprise grade anti malware solution to help protect against nefarious activities.
- **Regular Patching**
  Due to the proliferation of modern exploits, it is highly recommended that a regularly occurring patching program is implemented on the host OS.
- **Regular Backups**
  Due to the high criticality of the stored information, it is highly recommended for the customer to deploy an appropriate replication or backup solution. Please see the "Backup & Hypervisor Replication" section of this document for details.
- **Uninterrupted Power Source (UPS)**
  Customer is advised to ensure product hardware is plugged into an appropriate UPS power supply. The application Database or OS may become corrupt if not shut down properly during a power outage.
- **Data/Host Encryption**
  Due to the high sensitivity of the stored information, customer is advised to utilize either full host encryption (i.e. BitLocker) or storage solution encryption; whichever is more appropriate.
- **Static LAN IP**
  Due to the need for external sources to connect to these devices, a Static LAN IP is required when deploying.
- **SSL Certificate & DNS Record**
  Customer will need to provide an appropriate URL and SSL certificate as per their standards. If one is not provided, a self hosted certificate can be enabled during implementation, however this is not advised, especially if the server is to be publicly accessible.

Technical Support:

Technical support, as per the terms outlined in the RamSoft Software Agreement, is provided to end-users by RamSoft Support while under an active support contract. RamSoft's RMM, LogMeIn, will only be installed and utilized if under an active support contract. The RamSoft Support Team is reachable through www.ramsoft.com, 888-343-9146, and +1-416-674-1347.

2. POWERSERVER

PowerServer & PowerServer TELE/LITE

Study Volume	CPU*	RAM	Hard Drive*
<15,000	4 cores	12 GB	Equivalent resiliency to EQUIVALENT RESILIENCY TO RAID 6 recommended 2TB SATA equivalent IOPS
15,000 – 30,000	4 Cores	16 GB	Equivalent resiliency to RAID 6 recommended 2TB SAS equivalent IOPS
30,000 – 100,000	6 Cores	24 GB	Equivalent resiliency to RAID 6 recommended 4TB SAS equivalent IOPS
100,000 – 200,000	8/12 Cores	32/64 GB	Equivalent resiliency to RAID 6 recommended 6TB SAS equivalent IOPS
>200,000	16 Cores	64/128 GB	Equivalent resiliency to RAID 6 recommended 6TB SAS equivalent IOPS

- *Application is programmed to run on any newer Intel, AMD, or Xeon chipset. i5 or equivalent is recommended.*
- *Scaling past a large single socket vCPU deployment is not recommended. A multi node design should be preferred.*
- *Sizing estimates are recommendations only. Actual needs will depend on modalities, study sizes, retention, priors, etc.*
- *Equivalent resiliency to RAID 6 is highly recommended due to its ability to provide optimal storage resiliency*
- *Due to the vastly larger sizes of **tomosynthesis or mammography studies**, server resources generally*
- *need to be increased to accommodate their processing.*

Additional Requirements:

- **Operating System**: Up to Date Microsoft Server 2019 or 2022 (Standard or Datacenter license)
- **Storage Types**: Local (SAS equivalent), SAN, or RamSoft Hosted Cloud Storage
- **Partitions:** Primary partition should have 100 GB for OS & PowerServer, Partition 2 should be sized accordingly for Database and Image volume needs
- **LAN Throughput:** 1,000 Mbps (1 Gbps) For large concurrent study volumes 10 Gbps may be optimal
- **Virtualized Environment:** RamSoft highly recommends deploying on a virtualized environment due to the inherent management capabilities. Hyper-V & VMware are fully supported.
- **Static LAN IP:** Host must be provisioned with a static internal LAN IP

RamSoft Provided:

- **Remote Access & Monitoring**: RamSoft will deploy and manage its RMM solution, LogMeIn.
- **Server Setup**: Initial installation and validation of product performed by RamSoft technicians.

PowerServer RIS/PACS

Study Volume	CPU*	RAM	Hard Drive*
<15,000	4 cores	16 GB	Equivalent resiliency to RAID 6 recommended 1TB SATA equivalent IOPS
15,000 – 30,000	6 Cores	16 GB	Equivalent resiliency to RAID 6 recommended 2TB SAS equivalent IOPS
30,000 – 100,000	8 Cores	32 GB	Equivalent resiliency to RAID 6 recommended 4TB SAS equivalent IOPS
100,000 – 200,000	8/12 Cores	32/64 GB	Equivalent resiliency to RAID 6 recommended 6TB SAS equivalent IOPS
>200,000	16 Cores	64/128 GB	Equivalent resiliency to RAID 6 recommended 6TB SAS equivalent IOPS

- *Application is programmed to run on any newer Intel, AMD, or Xeon chipset. i5 or equivalent is recommended.*
- *Scaling past a large single socket vCPU deployment is not recommended. A multi node design should be preferred.*
- *Sizing estimates are recommendations only. Actual needs will depend on modalities, study sizes, retention, priors, etc.*
- *Equivalent resiliency to RAID 6 is highly recommended due to its ability to provide optimal storage resiliency.*
- *Due to the vastly larger sizes of **tomosynthesis or mammography studies**, server resources generally need to be increased to accommodate their processing.*

<u>Additional Requirements:</u>

- **Operating System**: Up to Date Microsoft Server 2019, or 2022 (Standard or Datacenter license)
- **Storage Types**: Local (SAS equivalent), SAN, or RamSoft Hosted Cloud Storage
- **Partitions:** Primary partition should have 100 GB for OS & PowerServer, Partition 2 should be sized accordingly for Database and Image volume needs
- **LAN Throughput:** 1,000 Mbps (1 Gbps) For large concurrent study volumes 10 Gbps may be optimal
- **Virtualized Environment:** RamSoft highly recommends deploying on a virtualized environment due to the inherent management capabilities. Hyper-V & VMware are fully supported.
- **Static LAN IP:** Host must be provisioned with a static internal LAN IP

RamSoft Provided:

- **Remote Access & Monitoring**: RamSoft will deploy and manage its RMM solution, LogMeIn.
- **Server Setup**: Initial installation and validation of product performed by RamSoft technicians.

3. ROUTERS AND GATEWAY

Gateway Router

Study Volume	Deployment	CPU*	RAM	Hard Drive*
<30,000	Small form factor PC (Windows 11)	4 cores	16 GB	256 GB SATA equivalent IOPS
>30,000	Server grade (Windows Server)	4 Cores	16 GB	Equivalent resiliency to RAID 6 recommended 2TB SAS equivalent IOPS

- *Application is programmed to run on any newer Intel, AMD, or Xeon chipset. i5 or equivalent is recommended.*
- *Sizing estimates are recommendations only. Actual needs will depend on modalities, study sizes, retention, priors, etc.*
- *Equivalent resiliency to RAID 6 is highly recommended due to its ability to provide optimal storage resiliency*

Additional Requirements:

- **Operating System**:
  - **(<30,000)** up to date Microsoft Windows 11 (64-bit)
  - **(>30,000)** up to Date Microsoft Server 2019, or 2022 (Standard or Datacenter license)
- **Storage Types**: Local or SAN storage
- **Partitions:** Primary partition should have 100 GB for OS & Router Software, Partition 2 should be sized accordingly for Database and Image volume
- **LAN Throughput:** 1,000 Mbps (1 Gbps)
- **Static LAN IP:** Host must be provisioned with a static internal LAN IP

RamSoft Provided:

- **Remote Access & Monitoring**: RamSoft will deploy and manage its RMM solution, LogMeIn.

Gateway Router with PowerCache/Gateway or only PowerCache

Study Volume	Deployment	CPU*	RAM	Hard Drive*
<30,000	Small form factor PC (Windows 11)	4 cores	16 GB	256 GB SATA Equivalent IOPS + 1 TB Caching
>30,000	Server grade (Windows Server)	4 Cores	16 GB	Equivalent resiliency to RAID 6 recommended 2TB SAS equivalent IOPS

- *Application is programmed to run on any newer Intel, AMD, or Xeon chipset. i5 or equivalent is recommended.*
- *Sizing estimates are recommendations only. Actual needs will depend on modalities, study sizes, retention, priors, etc.*
- *Equivalent resiliency to RAID 6 is highly recommended due to its ability to provide optimal storage resiliency*

Additional Requirements:

- **Operating System**:
    - o **(<30,000**) up to date Microsoft Windows 11 (64-bit)
    - o **(>30,000)** up to Date Microsoft Server 2019, or 2022 (Standard or Datacenter license)
- **Storage Types**: Local or SAN storage
- **Partitions:** Primary partition should have 100 GB for OS & Router Software, 2 additional partitions for gateway router image volume and PowerCache image volume sized accordingly as per image requirements
- **LAN Throughput:** 1,000 Mbps (1 Gbps)
- **Static LAN IP:** Host must be provisioned with a static internal LAN IP

RamSoft Provided:

- **Remote Access & Monitoring**: RamSoft will deploy and manage its RMM solution, LogMeIn.

GATEWAY VIEWER, including MAMMOGRAPHY

Deployment	CPU*	RAM	Hard Drive	
Standalone PC	4 cores	16 GB*	256	SSD

- *Application is programmed to run on any newer Intel, AMD, or Xeon chipset. i5 or equivalent is recommended.*
- *32 GB RAM is recommended for tomosynthesis or mammography studies*

Additional Requirements:

- **Operating System**: Up to date version of Microsoft Windows 11 (64-bit)
- **Storage Types**: Local (SAS equivalent)
- **Partitions:**
    - Primary partition – should have 100 GB for OS & Router Software
    - Secondary Partition – should be sized accordingly for Database and Image volume
- **LAN Throughput:** 1,000 Mbps (1 Gbps)
- **Static LAN IP:** Host must be provisioned with a static internal LAN IP
- **Medical Grade Image Rendering:** See supported graphic cards in Peripherals section
- **Medical Grade Image Display:** See supported monitors in Peripherals section

4. WORKSTATION – RADIOLOGIST SCHEDULER, TECH, Etc.

Deployment	CPU*	RAM	Hard Drive
Standalone PC	4 cores	16 GB*	256 GB SSD

- *Application is programmed to run on any newer Intel, AMD, or Xeon chipset. i5 or equivalent is recommended.*
- *32 GB RAM is recommended for tomosynthesis or mammography studies*

Additional Requirements:

- **Operating System**: up to date Microsoft Windows 11 (64-bit)
- **Storage Types**: Local SSD
- **Partitions:** All storage assigned to a single partition
- **LAN Throughput:** 1,000 Mbps (1 Gbps)
- **Medical Grade Image Rendering:** See supported graphic cards in Peripherals section
- **Medical Grade Image Display:** See supported monitors in Peripherals section

Supported Platforms for Speech Recognition Software:

Speech Recognition	Operating System	Microsoft Edge	Microsoft Word (32-bit or 64-bit)
	11	2021 Release	Office 365
Speech Understanding™	X	X	X
Dragon Medical Practice Edition 4.3 (or later)	X	X	X

Workstation Peripherals (Optional)

Type Of Peripheral	Supported Devices/Models
RapidKeys	RamSoft RapidKeys
Dictation Microphones	Philips SpeechMike: LFH-3000, LFH-3010, LFH-3200, LFH-3210, LFH-3300, LFH-3310, LFH-5274, LFH-5276, LFH-5262, LFH-5272, LFH-5282, LFH-5284
	Nuance: PowerMic II
Transcription Foot Pedals	Philips: LFH-2310
	Infinity: IN-USB2
Scanners	Any WIA Compliant Scanner
CD Printers	Primera: Bravo SE Disc Publisher
Label Printers	DYMO: LabelWriter 450
Barcode Scanners	Metrologic: VoyagerCS MS9540
Film Digitizer	Any Vidar Film Digitizer
Monitors	Eizo, Totoku, LG, WIDE
Graphic Cards	ATI FirePro W5100 (4GB)
Signature Pads	IDGem 1x5 Backlit RF

Tablet Displays	Any Windows 11 Touch Display

5. BANDWIDTH GUIDELINES

Single Location Deployment

If deploying PowerServer, and all stations, in a single location, then a LAN (Local Area Network) of 1 Gbps throughput throughout will suffice in majority of situations. For extremely high-volume study counts and high concurrent sessions, PowerServer solutions utilizing 10 Gbps at the server are fully supported.

Dispersed or Teleradiologist Deployment

RamSoft has various products available (i.e., PowerCache) to optimize a dispersed model deployment and ensure the best experience for your business. Please ask a RamSoft representative about such offerings.

RamSoft PowerServer is fully compatible with a dispersed workforce. There are two main deployment options:

- Deploy PowerServer on the internal network and utilize a remote access VPN technology for remote staff to access the solution
- Deploy PowerServer in a DMZ, and securely expose to the public internet. Remote staff can access the PowerServer directly without requiring a VPN. By default PowerServer and PowerReader communication is encrypted.

Bandwidth requirements are highly dependent on concurrent sessions, study sizes, modalities, priors, and expected download times. Lower bandwidth will function; however, studies will populate slower. Alternatively, faster bandwidth will allow for faster study download.

Generally, for an average size deployment, WAN throughputs of at least 100 Mbps are required for the best user experience. If the customer is a larger entity, with a large number of concurrent sessions, appropriately larger WAN throughputs will be necessary. WAN traffic and congestion from other sources must also be taken into consideration.

6. BACKUP & HYPERVISOR REPLICATION

Whole VM backups & Replication (PowerServer)

RamSoft's PowerServer product is best deployed in a virtualized environment where virtual management tools can be fully leveraged to ease management. PowerServer's database is VSS aware making it compatible with most VM level backup & replication technologies, including both Hyper-V or VMware.

Microsoft Hyper-V Methods

Technology	
Manual Checkpoint	PowerServer is fully compatible with checkpoints in Hyper-V
Hyper-V Replication	PowerServer is fully compatible with Microsoft's live Hyper-V replica technology Vendor documentation can be found here
Hyper-V Data Protection Manager	PowerServer is fully compatible with Microsoft's Hyper-V backup offering Vendor documentation can be found here
Veeam, VRanger & other market tools	PowerServer is fully compatible with most market-leading VM level replication & Backup toolsets

VMWare Methods

Technology	
Manual Snapshot	PowerServer is fully compatible with snapshots in VMware
vSphere Replication	PowerServer is fully compatible with vSphere Replication technology Vendor documentation can be found here
VSphere Data Protection	PowerServer is fully compatible with vSphere Data Protection technology Vendor documentation can be found here
Veeam, VRanger & other market tools	PowerServer is fully compatible with most market-leading VM level replication & Backup toolsets

Items to Note:

If performing VM level replication, any sites and/or workstations must have connectivity to both the primary and secondary (replica) locations to ensure appropriate failover times.

If replicating to a different geographic location, it is imperative to ensure traffic is encrypted via alternate means (i.e., IPsec) and Wide Area Network throughputs are sufficient for synchronization.

Clustered Virtualized Environment with SAN storage (PowerServer)
PowerServer is fully compatible with a large clustered virtualized environment that utilizes backend SAN type storage. Live migration tools such as Vmotion (VMWare) and Live Migration (Hyper-V) can be leveraged.

File Level Only Backups (PowerServer)
RamSoft products are compatible with most Windows-based file backup solutions. A critical requirement is for the solution to be capable of handling folder/file structures with potentially millions of individual files that change frequently.

If you wish to perform file-level backups to an alternate storage location, the following are the critical components (and default locations) that must be backed up to ensure recoverability.

Note: The backup location must have sufficient storage to accommodate the data volume. Generally, this means at least the same amount as primary storage.

Files	Default Location
TemplateLibrary	C:\ProgramData\RamSoft\TemplateLibrary
PeerCertificates	C:\Program Files\RamSoft\PowerServer\Certificates
FormConfig	C:\ProgramData\RamSoft\FormConfig
PACS Database Backup files	D:\RamSoft Data\DBBack
Image Volume(s)	D:\RamSoft Data\Image

File Level Image Only Backups (PowerServer) Details

Please utilize this backup method with caution. File-level Image only backups are intended for those customers who wish to backup only their images. Although this means a smaller backup size, the PowerServer application and its database are not backed up. In the event of a recovery, a net new installation of PowerServer is required, as well as an image import. All patient/study demographics will be lost.

Note: The backup location must have sufficient storage to accommodate the data volume.

Files	Typical Location
Image Volume(s)	D:\RamSoft Data\Image

DB only backups (Gateway Router)

This method of backup is reserved for Gateway Router (with or without PowerCache) only. The DB file contains all locally significant configurations, i.e., stations List, which, if lost, would delay recovery significantly.

Files	Default Location
Configuration Database	C:\ProgramData\RamSoft\DB

7. SUPPORT CONTRACT OPTIONS

Below is a breakdown of the various support options available for all RamSoft products. An active support contract is required in all instances.

Product	Software Support Available	RamSoft Anytime Remote Access Capabilities	RamSoft Remote Monitoring Performed
PowerServer (all flavors)	Yes	Yes	Yes
Gateway Router	Yes	Yes	Yes
Gateway Viewer	Yes	Yes	Possible*
Gateway Mammo Viewer	Yes	Yes	Possible*
PowerCache	Yes	Yes	Yes
Tech workstation	Yes	No	No
Radiologist workstation	Yes	No	No

*Depending on the use case. If the station is utilized for viewing purposes only, no monitoring is performed. If the workstation is utilized for viewing and high-volume study routing, then monitoring is performed.

Necessary: RamSoft utilizes LogMeIn to provide ongoing remote support and monitoring. The device in question must have internet access (outbound only) for the agent to check-in. If the customer implements network restrictions on their perimeter firewalls, the following entries must be whitelisted: *Link*.

VERSIONS

Version	Revision Notes	Updated by	Reviewed by	Effective Date
Rev 1	Updated for 6.0 Release	LLG	VRN	2014/12/12
Rev 2	Updated for 6.0 GA Release	NWC	LLG	2015/07/24
Rev 3	Removed the requirements for Adobe PDF Reader	LLG	SRN	2015/08/21
Rev 4	Added support for Word 2016 (Not recommended for using with Dragon and M*Modal yet) and the requirement to install Microsoft Word in PowerServer.	LLG	SRN	2015/10/28
Rev 5	Remove support for Windows 8 and Internet Explorer 10.	LLG	SRN	2016/02/10
Rev 6	Added a section on RamSoft Backup plans	RDV	NC	2016/08/03
Rev 7	Modified the Backup Plans Images and Legend	MAB	RDV	2016/05/31
Rev 8	Modified the Radiologist Workstation Hardware requirements and included Dragon 2.3 Support for Word 2016	RDV	LLG	2016/08/19
Rev 9	Added support for Windows Server 2016 and JRE 8	RDV	LLG	2016/11/09
Rev 10	Added the recommendation to store Database on SSD storage device	LLG	SRN	2017/01/16
Rev 11	Removed minimum supported hardware column in Section 4.1 Changed Windows 8.1 to Windows 10 Pro Changed Windows 2012 R2 to Windows 2016 The recommended for MS Word is set to Word 2013 or later	JZG	LLG	2017/09/20
Rev 12	Removed minimum supported hardware column in all sections and revised the CPU requirements	LLG	VRN	2017/12/12
Rev 13	Added support for Dragon Medical Practice Edition 4	JZG	LLG	2018/05/10

Rev 14	Modified the Radiologist Workstation Hardware requirements to support Windows 10	JZG	LLG	2018/09/20	
Rev 15	Updated with Windows Server 2019 support	JZG	LLG	2019/02/15	
Rev 16	Added support for Azure Blob Container, VMWare hypervisor, LG Medical Display	JZG	LLG	2019/07/24	
Rev 17	Removed support for Windows Server 2008 R2, Windows 7 and Windows 8.1 Revised support for MS Word 2016 and Office 365 Revised the support version for Dragon Medical Practice Edition	LLG	VRN	2020/02/18	
Rev 18	Major Revision. Formatting changes - all sectons. Inclusion of backup & replication section, bandwidth guidelines, & support section. Also inclusion of customer responsibilities section at the start of the document.	MKS	LLG	2020/05/05	
Rev 19	Removed support for Windows Server 2012 R2.	MKS	LLG	2020/07/03	
Rev 20	Added requirement for static IP to all products. Changed Anti Malware & Patching requirements to explicitly state they are customer responsibility. Increased gateway mammo viewer to 32 GB Ram Increased gateway viewer and router to 16 GB Ram Added NUMA compatibility statement for PowerServer Specs. Added note regarding Win 7 support being ceased end of 2021	MKS	LLG	2021/01/08	
Rev 21	Condensed workstation section. Moved physical hardware to supported hardware	MKS	LLG	2021/11/04	
Rev 22	Removed support for Internet Explorer and replaced it with Microsoft Edge (Release 2021).	SV	MKS	2022/02/11	
Rev 23	Added support for Windows Server 2022, customer requirements section for SSL certificate, and public DNS entry	MKS	LLG	2022/09/27	

Rev 24	Replaced Windows 10 Pro support to Windows 11 Removed support for Word 2016, Windows Server 2016 Increased RAM requirement for Gateway Router to 16 GB RAID 6 Recommendation updated to Equivalent resiliency to RAID 6 Updated style and format of the document	MK	EM	2026/01/13
Rev 25	Updated to version 6.7	MK	-	2026/01/30